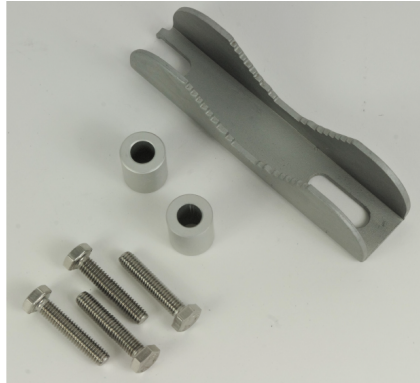40 mm M8 screws, plain washers, and Nyloc nuts

V3000 mount

28 mm M6 screws, M8 spacers, and pole mount clamp

V3000 Tilt bracket (N000045L002A)

The tilt bracket (as shown in Figure 22) is used to provide elevation adjustment when a V3000 CN or V5000 DN is mounted on a pole. The tilt bracket works with poles with diameters in the range of 25 mm to 75 mm (1 inch to 3 inches).

The tilt bracket assembly may be used with third-party band clamps to mount the ODU on a larger pole (the diameter range depends on the clamps used).

Figure 22: *Tilt bracket assembly*

V5000 Pole mount (C000000L137A)

The pole mount (as shown in Figure 23) is used to mount a V5000 DN on a vertical pole with a diameter in the range of 25 mm to 75 mm (1 inch to 3 inches. It provides coarse azimuth (but not elevation) adjustment. Band clamps can be used for V5000 pole mount to accommodate the larger diameter poles.
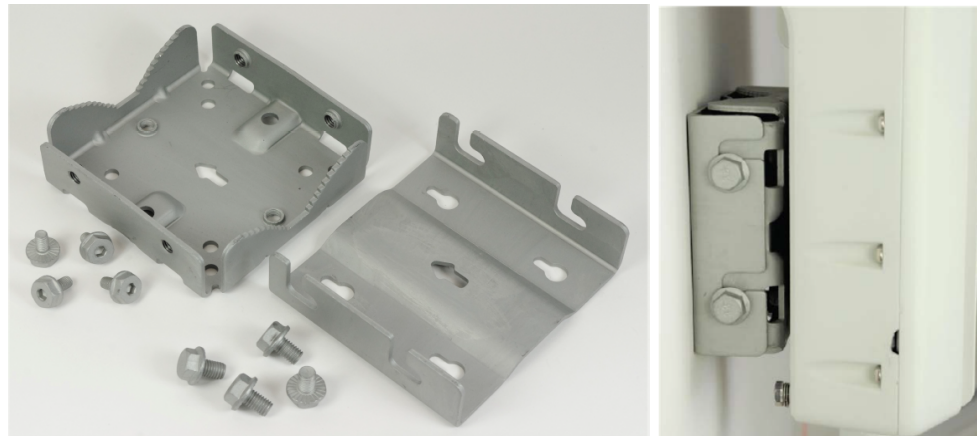
Figure 23: *Pole mount*

V5000 Wall mount (C000000L136A)

The wall mount (Wall mount figure below) is used to mount a V5000 DN on a vertical wall. It does not provide azimuth or elevation adjustment. The wall mount requires additional fixing hardware suitable for the type of wall.

Figure 24: *Wall mount*

Bracket part numbers

Order mounting brackets by using the Cambium part numbers listed in below table.

Table 8: Radio mounting bracket part numbers

Bracket	Radio nodes	Cambium Part Number
Adjustable pole mount	V1000	N000900L022A
Tilt bracket assembly	V3000	N000045L002A
Wall mount bracket	V5000	C000000L136A

| Bracket	Radio nodes	Cambium Part Number
Pole mount bracket	V5000	C000000L137A
Precision bracket	V3000	C000000L125A

Radio accessories

Telescope mounting kit for precision brackets

An alignment telescope provides the most accurate option for the alignment of the precision bracket during installation. The telescope is temporarily mounted on the bracket using the telescope mounting kit for precision brackets.

The telescope mounting kit consists of a mounting plate, a knurled screw, and two rubber O-rings.

Order the telescope mounting kit from Cambium Networks.

Figure 25: *Telescope mounting kit*
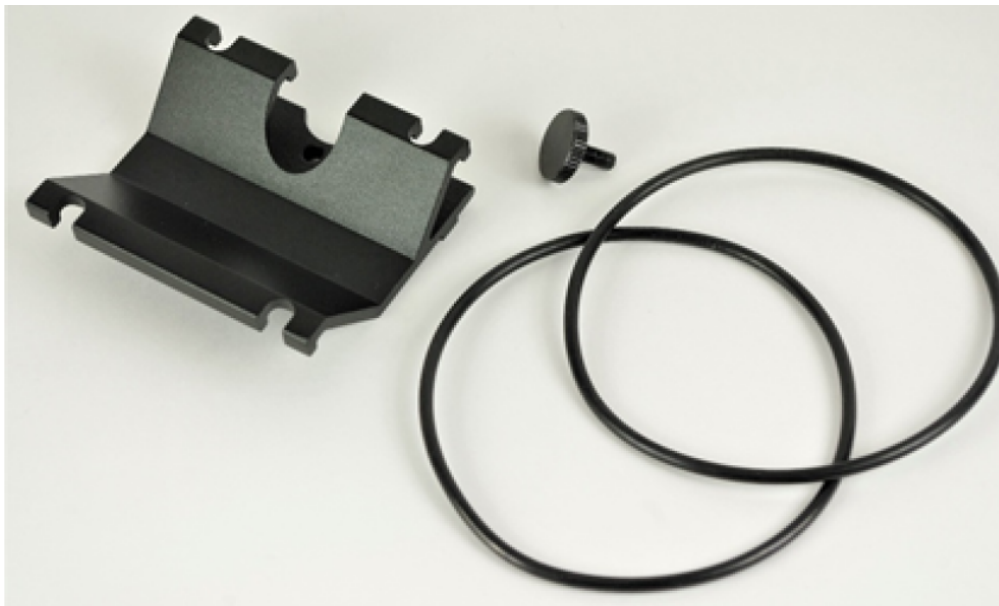
Order a suitable telescope from a specialist supplier specifying the following details:

Right angle, erecting, 9x50 mm alignment scope with 5° field of view

Alignment Tube

The Alignment tube (as shown in Figure 27) is designed to be used with V3000 when setting up a Point-toPoint link. It is Ideal for aligning a Point-to-Point link that spans up to 600 m.

Figure 27: *Alignment Tube*

For longer links up to 3 km, Cambium Networks suggests to use the telescopic mounting kit (C000000L139) and a finder scope.

> **Note**
>
> For details on how to fit the Alignment tube for V3000, refer to Fixing the alignment tube.

Radio accessory part numbers

Order radio accessories using the Cambium Part Number in the Radio accessory part numbers table below.

Table 9: Radio accessory part numbers

Accessory	Radio nodes	Cambium Part Number
Telescope mounting kit	V3000	C000000L139A
Alignment Tube	V3000	C000000L190A

Radio external interfaces

V1000 CN

Figure 28: *External interfaces for V1000 CN*

Table 10: External interfaces V1000 CN

Port name	Connector	Interface	Description
PSU	RJ45	PoE input	Standard 802.3af/at PoE
		100/1000 BASE-T Ethernet	Data and management

V2000 CN

Table 11: External interfaces - V2000 CN

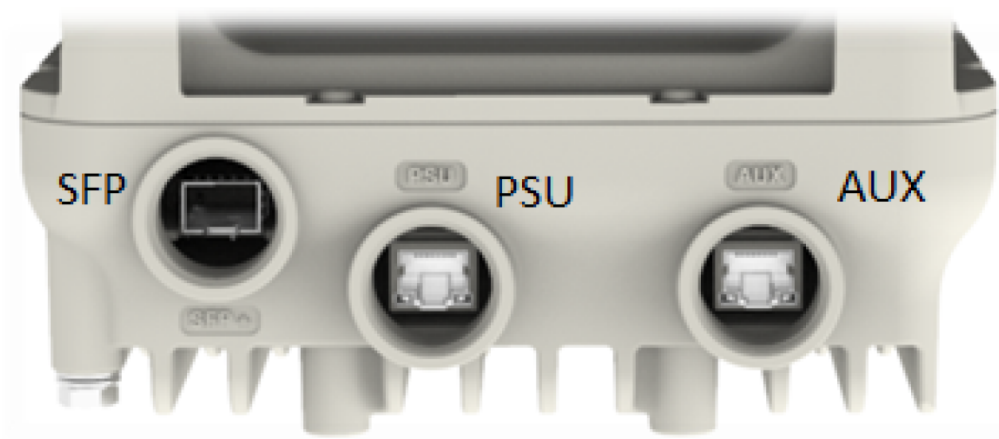| Port name	Connector	Interface	Description
PSU	RJ45	POE Input	Passive POE
		100m/1000m/2.5G BASE-T Ethernet	Data and management
AUX	RJ45	POE Output	Standard IEEE 802.3at POE
		100m/1000m/2.5G BASE-T Ethernet	Data and management

V3000 CN

Figure 30: *External interfaces for V3000 CN*

Table 12: External interfaces V3000 CN

Port name	Connector	Interface	Description
SFP+	SFP	10G BASE-SR/10G BASE-LR/1G Base-SX using optional SFP+/SFP optical or copper module	Data and management
		SFP-1G-SX / SFP-1G-LX using optional SFP optical or copper module	
PSU	RJ45	PoE input	Passive PoE
		100m/1000m/2.5G BASE-T/5G BASE-T/ 10G BASE-T Ethernet	Data and management
AUX	RJ45	PoE output	Standard IEEE 802.3af/at
		100/1000 BASE-T Ethernet	Data and management

V5000 DN

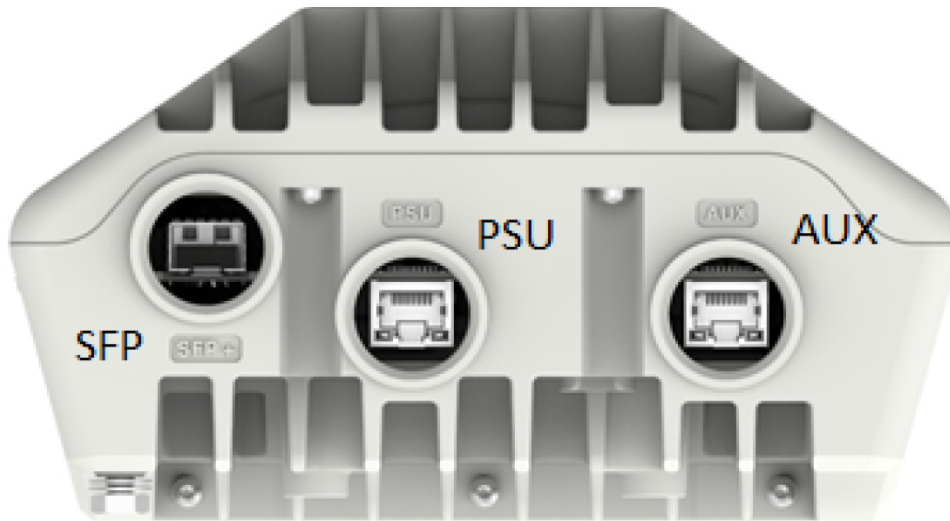Figure 31: *External interfaces for V5000 DN*

Table 13: External interfaces V5000 DN

Port name	Connector	Interface	Description
SFP+	SFP	10G BASE-SR/10G BASE-LR/1G Base-SX using optional SFP+/SFP optical or copper module SFP-1G-SX / SFP-1G-LX using optional SFP optical or copper module	Data and management
PSU	RJ45	PoE input	Passive PoE
		100m/1000m/2.5G BASE-T/5G BASE-T/ 10G BASE-T Ethernet	Data and management
AUX	RJ45	PoE output	Standard IEEE 802.3af/at
		100/1000 BASE-T Ethernet	Data and management

Radio specifications

The 60 GHz cnWave Radios conform to the specifications listed in Radio node specifications.

Table 14: Radio node specifications

Category	Specification	
Dimensions	V1000 Client Node	169 mm × 100 mm × 54 mm (6.6 in × 3.9 in × 2.1 in)

Category	Specification	
	V2000 Client Node	250 mm x 200 mm x 300 mm (9.9 in x 7.9 in x 11.8 in)
	V3000 Client Node (44.5 dBi)	421 mm x 347 mm x 349 mm (16.5 in x 13.6 in x 13.7 in)
	V3000 Client Node (40.5 dBi)	343 mm x 198 mm x 251 mm (13.5 in x 7.7 in x 9.8 in)
	V5000 Distribution Node	280 mm × 186 mm × 103 mm (11.0 in × 7.3 in × 4.0 in)
Weight	V1000 Client Node	0.46 kg (1.01 lbs)
	V2000 Client Node	2.7 kg (5.95 lbs)
	V3000 Client Node (44.5 dBi)	4.17 kg (9.1 lbs) including big antenna dish
		6.12 kg (13.4 lbs) = radio with dish + precision bracket
	V3000 Client Node (40.5 dBi)	3.2 kg (7.05 lbs) including small antenna dish
		5.15 kg (11.3 lbs) = radio with dish + precision bracket
	V5000 Distribution Node	3.12 kg (6.8 lbs) including antenna dish
		3.76 kg (8.2 lbs) = radio with dish + universal pole bracket
Temperature	-40°C (-40°F) to +60°C (140°F)	
Wind survival	200 kph (124 mph) maximum	
Humidity	100% condensing	
Liquid and particle ingress	IP66, IP67	
Power consumption	V1000 Client Node	10 W
	V2000 Client Node	30W, up to 60W with POE Out enabled
	V3000 Client Node	30 W, up to 60 W with PoE Out enabled
	V5000 Distribution Node	35 W, up to 65 W with PoE Out enabled
Power input interface	V1000 Client Node	IEEE 802.3af
	V2000 Client Node	Passive POE
	V3000 Client Node	Passive PoE
	V5000 Distribution Node	Passive PoE
Power output interface	V2000 Client Node	IEEE 802.3af/at, 25W maximum
	V3000 Client Node	IEEE802.3af/at, 25 W maximum
	V5000 Distribution Node	IEEE 802.3af/at, 25 W maximum

Theory of operation

The 60 GHz cnWave devices support Facebook connectivity technology called **Terragraph**. cnWave devices implement IEEE 802.11ay WLAN standard and use 60GHz frequency band for wider spectrum and higher capacity. cnWave devices can provide multi-gigabit throughput from 100 M to 1.5 KM.

Deployment of the devices uses Open/R based layer3/IPv6 mesh for efficient distribution of traffic between the nodes and higher availability of the traffic. This also overcomes non-line of sight issues.

Devices use TDMA/TDD technology to achieve density deployment efficiency. Network and the nodes are configured, controlled, and monitored by a cloud-based E2E Controller.

Following terminologies are used for the network deployment:

- **Distribution Node (DN)** - DN connects with other DN for mesh network

- **Client Node (CN)** - CN connects to DN to provide high-speed connectivity

- **PoP** - DN connected to the back-haul

- **CPE** - Customer premises equipment devices like Wi-Fi router

Figure 32: *Deployment scenario*
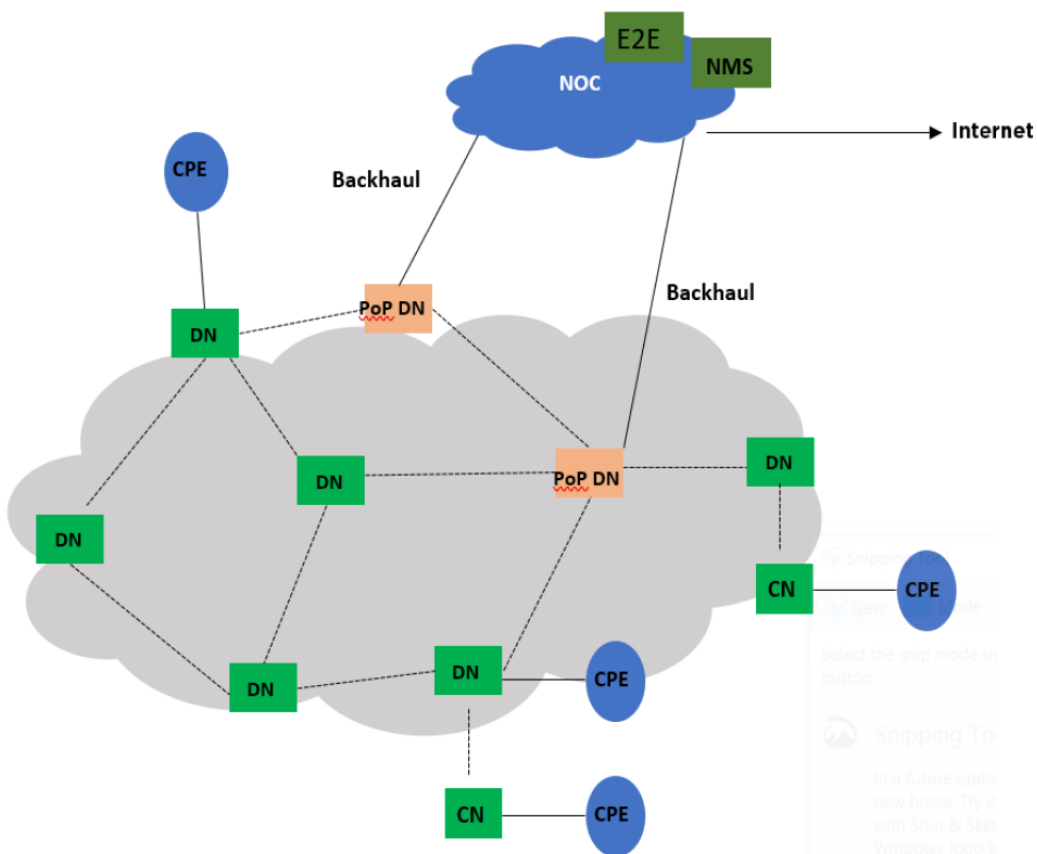
Power supply units (PSU)

PSU Options

Order PSUs from Cambium Networks. The power supply component and the part numbers are described in the following table.

Table 15: Power supply component part numbers

Product description	Radio node	Cambium part number
Outdoor AC/DC PSU, 100W, 54V DC	V3000 and V5000	N000000L179B
Waterproof PSU Cable Joiner 14-16 AWG	V3000 and V5000	N000000L180A
DC to RJ45 Plug Power Adaptor	V3000 and V5000	C000000L184A
Cable Gland, Long, M25, Qty 5	V3000 and V5000	C000000L124A
PoE, 60W, 56V, 5GbE DC Injector, Indoor, Energy Level 6 Supply	V2000, V3000, and V5000	N000000L142A
PoE, 60W, 56V, 10GbE DC Injector, Indoor, Energy Level 6 Supply	V2000, V3000, and V5000	C000000L141A
PoE, 30W, 56V, 5GbE DC Injector, Indoor, Energy Level 6 Supply	V1000 and V2000	N000000L034B
PoE Gigabit DC Injector, 15W Output at 56V, Energy Level 6, 0C to 50C	V1000	N000900L017A
AC power Injector 56V, 60W	V3000 and V5000	N000065L001C
CABLE, UL POWER SUPPLY CORD SET, 720mm, AUS/NZ	V1000, V2000, V3000, and V5000	N000900L011A
CABLE, UL POWER SUPPLY CORD SET, INDIA	V1000, V2000, V3000, and V5000	N000900L012A
CABLE, UL POWER SUPPLY CORD SET, ARGENTINA	V1000, V2000, V3000, and V5000	N000900L013A
CABLE, UL POWER SUPPLY CORD SET, CHINA	V1000, V2000, V3000, and V5000	N000900L015A
CABLE, UL POWER SUPPLY CORD SET, 720mm, US	V1000, V2000, V3000, and V5000	N000900L031A